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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

LUND, JEFFRIE ROBERT

ART UNIT

PAPER NUMBER

1763

15

DATE MAILED: 04/16/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/601,109

Applicant(s)

LEYCURAS, ANDRE

Examiner

Jeffrie R. Lund

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☐ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) 1-5 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 6-21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

**DETAILED ACTION**

***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 6-9, 14, and 16-18 are rejected under 35 U.S.C. 102(e) as being clearly anticipated by Griffiths et al, US Patent 6,133,550.

Griffiths et al teaches the claimed invention in figures 1 and 5, and throughout the specification, specifically, column 8 lines 2-31, column 12 lines 6-33, and column 13 lines 9-21.

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 10, 11, and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Griffiths et al, US Patent 5,253,324, and Wortman et al, US Patent 5,253,324.

Griffiths et al teaches a reactor for chemical vapor deposition that includes a horizontal duct 110 made of refractory material (silicon carbide coated graphite or quartz); a first heating means 140 for heating the upper wall 123; and a second heating means 140 for heating the lower wall 121. The heating means all include an independent voltage supply and a resistive element. The horizontal duct can be surrounded with a heat shield.

Griffiths et al differs from the present invention in that Griffiths et al does not teach that the heating means and heat shield are in a tube, the duct does not contact the tube, and the upper and lower heating means are offset in a longitudinal direction of the duct.

Wortman et al, US Patent 5,253,324, teaches a rapid thermal processing apparatus that includes a reactor that consists of a duct 14, a heat shield 11, both of which are located in a tube 22, the duct does not contact the tube, and the heating means are off set in a longitudinal direction.

The motivation for enclosing the heat shield and duct in a tube is to further isolate the duct from the ambient atmosphere to prevent contamination of the duct and to isolate the clean from the high temperature duct to improve the safety of employees working near the duct. The motivation to ensure that the duct does not contact the tube is improve the isothermal conditions of the duct by preventing hot or cold spots caused by thermal transfer via conduction at the contact point. The motivation for offsetting the heating means is to more uniformly heat the wafer.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to enclose the duct of Griffiths et al in the tube of Wortman et al and to offset the heaters as taught by Wortman et al.

5. Claims 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Griffiths et al and Wortman et al as applied to claims 10, 11 and 21 above, and further in view of Posa, US Patent 4,747,367.

Griffiths et al and Wortman et al differ from the present invention in that they do not teach passing a gas via the outlet of the duct between an internal space of the duct and the space lying between the duct and the tube to balance the pressure on the duct, or that the wall of the duct is 1 mm or less thick.

Posa teaches passing a gas via the outlet of the duct 19 between an internal space 16 of the duct and the space 18 lying between the duct and the tube to balance the pressure on the duct. (Figure 2)

The motivation for using the exhaust system of Posa in the apparatus of Griffiths et al and Wortman et al is to equalize the pressure between the tubes as taught by Posa. The motivation for making the wall of the duct 1 mm or less thick is to optimize the size of the wall to optimize its strength and thermal mass. Furthermore, it was held in *Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 469 U.S. 830, 225 USPQ 232 (1984), by the Federal Circuit that, where the only difference between the prior art and the claims was a recitation of relative dimensions of the claimed device and a device having the claimed relative dimensions would not

perform differently than the prior art device, the claimed device was not patentably distinct from the prior art device. (Also see MPEP 2144.04 (d))

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the exhaust system of Posa in the apparatus of Griffiths et al and Wortman et al and to optimize the thickness of the duct in the apparatus of Griffiths et al and Wortman et al.

6. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Griffiths et al, US patent 6,133,550, in view of Johnsgard et al, US Patent 6,002,109.

Griffiths et al was discussed above.

Griffiths et al differs from the present invention in that Griffiths does not disclose the spacing between the heating element and duct.

Johnsgard et al teaches spacing the heater 0.125 of an inch (3 mm) from the lower wall (column 10 lines 56-58).

The motivation for spacing the heater 1-3 mm from the duct is to optimize the placement of the heater as taught by Johnsgard, and required to build the apparatus, but not disclosed by Griffiths et al. Furthermore, it was held in *Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 469 U.S. 830, 225 USPQ 232 (1984), by the Federal Circuit that, where the only difference between the prior art and the claims was a recitation of relative dimensions of the claimed device and a device having the claimed relative dimensions would not perform differently than the prior art device, the claimed device was not patentably distinct from the prior art device. (Also see MPEP 2144.04 (d))

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to optimize the placement of the heater in apparatus of Griffiths et al to 1-3 mm as taught by Johnsgard et al.

7. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Griffiths et al, US patent 6,133,550.

Griffiths et al was discussed above.

Griffiths et al differs from the present invention in that Griffiths does not disclose that the heaters are supplied with a voltage of 230 volts or less.

The standard voltage supplied by the electrical produces in the United States is 220 volts. It would be obvious to one of ordinary skill in the art to design the voltage requirement for the heater to be 220 volts (or 110 volts) so that the heater can draw power directly from the source without any special step up/down transformers. Such transformers would add cost and complexity to the apparatus. Therefore it would have been *prima facie obvious* to one of ordinary skill in the art at the time of the invention was made to design the heater to be supplied with 230 volts or less.

8. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Griffiths et al in view of Kordina et al, US Patent 5,695,567.

Griffiths et al was discussed above.

Griffiths et al differs from the present invention in that Griffiths does not teach that the duct is lined with a secondary duct made of refractory material.

Kordina et al teaches lining the walls of a susceptor with a refractory material (SiC)

The motivation for lining the walls of the duct with a refractory material is to prevent hot spots, which result in non-uniform processing of the substrate as taught by Kordina et al.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to line the duct of Griffiths et al with a refractory material as taught by Kordina et al.

### ***Response to Arguments***

9. Applicant's arguments, see page 2 through the middle of page 6, and page 7 through the first paragraph of page 8, filed March 4, 2003, with respect to the objection/rejection of the claims 6-21, in view of Shimizu, Mayuzumi, Wortman et al, Nordell et al, Kordina et al, Toole et al, and Toole et al and Mayuzumi, have been fully considered and are persuasive. The objection/rejection of the claims 6-21 has been withdrawn. .

10. Applicant's arguments filed March 4, 2003, specifically those directed to Griffiths et al have been fully considered but they are not persuasive.

In regard to the argument that Griffiths et al does not teach a means to emit compounds in a gaseous form into the duct, the examiner disagree, Griffiths et al teaches in column 8 lines 28-31 "Gas supply 150 and gas exhaust 151 may be provided for exposing the wafer to reactant gases useful for chemical vapor deposition." Clearly, Griffiths et al teaches a means to emit compounds in a gaseous form into the duct in order to deposit a material on the substrate by CVD.



In regard to the argument that Griffiths et al does not teach a means for heating a lower wall duct outside of the duct, rather, the lower heating means is in the duct as shown in figure 5, the examiner disagrees. The applicant is correct that figure 5 shows the heating means in the duct; however, the rejection is based of the first embodiment found in figure 1 that teaches in column 8 lines 7-9 "The base 121, side walls 122 and top 123 of furnace 110 may each be provided with heaters140". Therefore, Griffiths et al teaches the lower wall is heated by a heating means outside the duct as claimed in claim 6.

In regard to the argument that "Further, one of ordinary skill in the art of the invention would not place resistive heating means in a chemical vapor deposition reactor. One reason for this is that the electrical and chemical behaviors of the resistive elements in the reactor containing the gaseous compounds were not known at the time of the invention. Another reason was that the risks of chemical pollution because of the presence of resistive elements (at a temperature substantially higher than ambient temperature) were not known. Thus, it should be noted that all documents cited in the office action that disclose means to emit gaseous compounds have heating means composed of protection lamps and quartz ducts." The examiner disagrees. This statement of the state of the art is utterly false. Griffiths et al teaches a CVD reactor using resistive heating as noted above. Furthermore, the examiner takes official notice that resistive heating is well known in the art and is one of the most commonly used means of heating a wafer. The claimed invention limits the placement of the heater to outside the duct, and thus the art of record is limited to this construction. The examiner

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could provide thousands of references covering the last 30 years in which resistive heating elements are used to heat a wafer in a CVD reactor.

***Conclusion***

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffrie R. Lund whose telephone number is (703) 308-1796. The examiner can normally be reached on Monday-Thursday (6:30 am-6:00pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Mills can be reached on (703) 308-1633. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.



Jeffrie R. Lund  
Primary Examiner  
Art Unit 1763

JRL  
April 15, 2003